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10/615,941	07/10/2003	Kazuki Takemoto	03560.003339	1080

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EXAMINER	
BRIER, JEFFERY A	

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Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	Application No. 10/615,941	Applicant(s) TAKEMOTO ET AL.
	Examiner Jeffery A. Brier	Art Unit 2672

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 28 November 2005.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-3 and 5-18 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-3 and 5-18 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/28/2005 has been entered.

Information Disclosure Statement

2. The 12/05/2005 IDS directed the examiner's attention to copending application SN 09/648,463 which has been reviewed by this examiner in response to the IDS on 2/14/2006.

Response to Amendment

3. The amendment filed on 11/28/2005 has been entered. The amendments to the claims overcomes the previous 35 USC 112 second paragraph rejection.

Response to Argument

4. Applicants arguments filed on 11/28/2005 have been fully considered, but they are not deemed to be persuasive because Kitamura article teaches in section 2 using range image or stereo image to bring a real image of an object that exists in the real

world into a computer generated virtual world which is also discussed by applicant in paragraph 0028. Paragraph 0028 states:

[0028] A constraining shape input unit 1060 obtains the three-dimensional position of a constraining plane 2000 in real space, and inputs this to a constraining shape generating unit 1080. The present embodiment uses the stylus of the 3D SPACE FASTRAK sensor manufactured by Polhemus. This stylus is provided with one button (not shown) serving as a user interface for specifying the three-dimensional position of objects in the real space, and so forth. The present invention is not restricted to such three-dimensional pointing devices, rather, any arrangement may be applied as long as constraining shapes in real space can be precisely modeled, such as a method wherein image characteristics of real space are taken with a stereo camera to obtain the shape of an object.

Thus, Kitamura teaches "obtaining a constraining shape from a plurality of positions in real space (The measurements by the user in three dimensional real space, the device for obtaining the 3-D shape by using a range image, and the device for obtaining the 3-D shape by using multiple cameras.) designated by a user (The user measures, the user directs the range measuring device to locations in the real world, and the user directs the cameras to locations in the real world) using an operating unit (Ruler or range device or multiple camera device.) capable of obtaining three-dimensional positional information (Each of the devices, ruler, range and multiple camera obtain three-dimensional information.)".

The indication of allowability of claims 1-9 and 16-19 is withdrawn in view of a better understanding of the claims, disclosure, the Kitamura article and the broadening effect applicants paragraph 0028 has on the claimed invention.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-3 and 5-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoshifumi Kitamura and Fumio Kishino, Consolidated Manipulation of Virtual and Real Objects, September 1997, Proceedings of the ACM symposium on Virtual reality software and technology, pages 133-138. Kitamura teaches an augmented reality system that uses object constraints to control the visual interaction between the virtual objects and the real objects. Claim 10 does not have an image taking step and thus does not claim the obtaining a constraining shape is separate from the image taking step. Therefore Kitamura teaches this broad method.

A detailed analysis of the claims follows.

Claim 10:

Kitamura teaches an information processing method for changing the position and orientation of a virtual object in mixed reality space obtained by combining a real image and a virtual image, said method comprising the steps of:

obtaining a constraining shape from a plurality of positions in real space (*The measurements by the user in three dimensional real space, the device for obtaining the 3-D shape by using a range image, and the device for obtaining the 3-D shape by using*

multiple cameras.) designated by a user (*The user measures, the user directs the range measuring device to locations in the real world, and the user directs the cameras to locations in the real world.*) using an operating unit (*Ruler or range device or multiple camera device.*) capable of obtaining three-dimensional positional information (*Each of the devices, ruler, range and multiple camera obtain three-dimensional information.*)". (*The three paragraphs found in section 2 on page 134 of Kitamura teaches the user measuring the real objects, a device measuring the real objects with range in response to the user, or a device measuring the real objects with multiple cameras range in response to the user. Kitamura discusses in section 2 in the first paragraph using conventional modeling software after precisely measuring the size or length of the real object by hand or by the devices which is an operating unit capable of obtaining three-dimensional positional information.*);

changing the position and orientation of the virtual object according to instructions from the user, based on the obtained constraining shape as constraint conditions (*The first paragraph in section 5 on page 135 describes the user using a 6 DOF tracker device to manipulate the virtual objects. The shape of the real objects are used to constrain the movement of the virtual object by giving the real object a shape that the virtual object interacts with in a constrained manner. Sections 5.1 to 5.4 discusses manipulation of the virtual object based upon constraint conditions based on the shape of the real object. The shape generated from the external instructions constraints the interaction of the virtual object with the real object, see sections 5.1 to 5.4.*); and

combining an image of the virtual object generated according to the changed position and orientation, and the real image (*The introduction on page 133 second full paragraph discusses augmented reality which synthesizes a virtual object with a real object. The claim does not limit the form of the real image, thus, Kitamura teaches this limitation. Section 5.1 discusses after movement is detected by the 6DOF manipulator the virtual object is moved according to the constraints.*).

Claim 11:

Kitamura teaches an information processing method according to Claim 10, further comprising the step of combining a virtual image indicating the constraining shape with the real image (*The introduction on page 133 second full paragraph discusses augmented reality which synthesizes a virtual object with a real object. The claim does not limit the form of the real image, thus, Kitamura teaches this limitation. Section 5.1 discusses after movement is detected by the 6DOF manipulator the virtual object is moved according to the constraints.*).

Claim 12:

Kitamura teaches an information processing method according to Claim 10, wherein the constraining shape is a plane. (*On page 136 in the text above figure 2 determining a plane and using the plane to constrain movement of the virtual object is discussed with regards to figure 2.*).

Claim 13:

Kitamura teaches an information processing method according to Claim 10, wherein said changing step changing the position and orientation of the virtual object is carried out by changing the position and orientation of the operating unit (*The 6 DOF tracker is an operating unit. The user using the 6 DOF tracker device manipulates the virtual objects.*).

Claim 14:

Kitamura teaches a computer program product comprising a computer readable medium storing computer program code for performing the information processing method according to Claim 10 wherein the information processing method is executed by a computer device (*This article is directed to computers that generate the augmented reality scene since it was published by ACM for a symposium on virtual reality software and technology and since at page 133 in the last sentence in the second paragraph of section 1 software/hardware is discussed. Software causing a computer to perform Kitamura's augmented reality is inherently stored in a computer readable recording medium.*).

Claim 15:

Kitamura teaches a computer-readable recording medium, storing the computer program according to Claim 14 (*Software causing a computer to perform Kitamura's augmented reality is inherently stored in a computer readable recording medium.*).

Claim 16:

The functions of Kitamura corresponds to the claimed units because the software causes the computer to become a unit that performs a process. As seen below Kitamura performs the claimed processes.

Kitamura teaches an information processing device for aiding control operations relating to controlling the position and orientation of a virtual object, said device comprising:

an image capturing unit configured to capture a real image in real space (*The measurements by the user in three dimensional real space, the device for obtaining the 3-D shape by using a range image, and the device for obtaining the 3-D shape by using multiple cameras captures a real image in real space. The three paragraphs found in section 2 on page 134 of Kitamura teaches the user measuring the real objects, a device measuring the real objects with range in response to the user, or a device measuring the real objects with multiple cameras range in response to the user. The claim does not limit the form of the real image, thus, Kitamura teaches this limitation.*);

a virtual image generation unit for generating a virtual image of a virtual object according to the position and orientation of said image capturing unit (*Kitamura discusses in section 2 in the first paragraph using conventional modeling software after precisely measuring the size or length of the real object by hand or by the devices which is an generation unit capable of generating three-dimensional positional information.*) ;

a superimposing unit configured to superimpose the generated virtual image with the captured real image (*Section 2 discusses mixing the virtual and real world objects.*);

an inputting unit configured to input three-dimensional position information of a plurality of positions inputted by a user in the real space (*The measurements by the user in three dimensional real space, the device for obtaining the 3-D shape by using a range image, and the device for obtaining the 3-D shape by using multiple cameras are used to configure the constraints on the real world objects by using the three dimensional coordinates of the real world shape.*);

a setting unit configured to set a constraining shape based on the inputting three-dimensional position information (*The first paragraph in section 5 on page 135 describes the user using a 6 DOF tracker device to manipulate the virtual objects. The shape of the real objects are used to constrain the movement of the virtual object by giving the real object a shape that the virtual object interacts with in a constrained manner.*) ; and

an operating unit configured to control the position and orientation of the virtual object based on the constraining shape in accordance with the a user's instruction.(*Sections 5.1 to 5.4 discusses manipulation of the virtual object based upon constraint conditions based on the shape of the real object. The shape generated from the external instructions constrains the interaction of the virtual object with the real object, see sections 5.1 to 5.4. The introduction on page 133 second full paragraph discusses augmented reality which synthesizes a virtual object with a real object. Section 5.1 discusses after movement is detected by the 6DOF manipulator the virtual object is moved according to the constraints.*)

Claim 17:

Kitamura teaches an information processing device according to Claim 16, wherein the constraining shape is defined by polygons (*See section 4.1 second paragraph. Polyhedria includes polygons.*) and the apexes of the polygons are at positions inputted by the user (*According to section 2 the input points are used to form the real objects in the virtual world, thus, the apexes of the polyhedria correspond to the position inputted by the user by use of the ruler, range device, or device using multiple cameras.*) or the constraining shape is a plane passing through the positions inputted by the user (*A real sensed surface is a planar real world object.*).

Claim 18:

Kitamura teaches an information processing device according to Claim 16, wherein said operating unit performs at least one of the following operations in performing an operation controlling the position and orientation of the virtual object:

a translation operation for causing translational movement of the virtual object based on the constraining shape (*Page 137 column 1 lines 1-3 teaches translation when the virtual object collides with the real surface.*); or

a rotation operation for rotating the virtual object on an axis which is a normal vector at a plane where the constraining shape and the virtual object come into contact (*Page 137 column 1 lines 1-3 teaches rotation when the virtual object collides with the real surface.*) (*Page 137 column 1 lines 1-3 also teaches translation and rotation when the virtual object collides with the real surface*)..

Claims 1-3:

Means plus function claims 1-3 correspond to device claims 16-18 and the means of Kitamura, software and computer, are equivalent to applicant's means of software and computer.

Claims 5-7:

Step for claims 5-7 correspond to device claims 16-18 and the steps of Kitamura, software and computer, are equivalent to applicant's steps performed by software and computer.

Claims 8 and 9:

Claims 8 and 9 mirror claims 14 and 15 addressed above and they are rejected for the same reasons given above for claims 14 and 15.

Prior Art

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The article by Yoshifumi Kitamura, Amy Yee, and Fumio Kishino, titled A Sophisticated Manipulation Aid in a Virtual Environment using Dynamic Constraints

among Object Faces Presence, *Vol. 7, No. 5, October 1998, by the Massachusetts Institute of Technology pages* 460–477 .

The article by Gudrun Klinker, Didier Stricker, and Dirk Reiners titled Augmented Reality: A Balance Act between High Quality and Real-Time Constraints, 1999 by Technical University of Munich, Germany, Fraunhofer Project Group for Augmented Reality at ZGDV, Germany.

The article by Axel Pinz titled Consistent Visual Information Processing Applied to Object Recognition, Landmark Definition, and Real-Time Tracking, 2001, by Graz University of Technology, Institute of Electrical Measurement and Measurement Signal Processing, Schießstattgasse 14B, A-8010 Graz, Austria.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffery A Brier whose telephone number is (571) 272-7656. The examiner can normally be reached on M-F from 7:00 to 3:30. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Razavi, can be reached at (571) 272-7664. The fax phone Number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jeffery A. Brier

Jeffery A Brier
Primary Examiner
Art Unit 2672